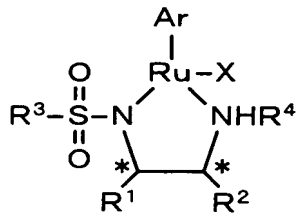
CLAIMS

1. A process for producing an optically active alcohol, comprising placing a metal complex represented by general formula (1) below and a ketone compound in a polar solvent and stirring the mixture under pressurized hydrogen to hydrogenate the ketone compound to thereby obtain the optically active alcohol:

General Formula (1)



(where R^1 and R^2 may be the same or different and are each selected from the group consisting of an alkyl group, an optionally substituted phenyl group, an optionally substituted naphthyl group, and an optionally substituted cycloalkyl group, or together form an optionally substituted alicyclic ring;

R^3 is one selected from the group consisting of an alkyl group, a perfluoroalkyl group, an optionally substituted naphthyl group, an optionally substituted phenyl group, and a camphor group;

R^4 is a hydrogen atom or an alkyl group;

Ar is an optionally substituted benzene;

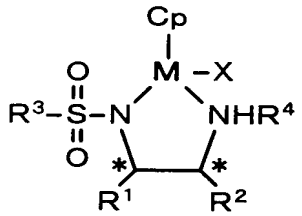
X is an anionic group; and

* represents an asymmetric carbon.)

2. A process for producing an optically active alcohol,

comprising placing a metal complex represented by general formula (2) and a ketone compound in a polar solvent and stirring the mixture under pressurized hydrogen to hydrogenate the ketone compound to thereby obtain the optically active alcohol:

General Formula (2)



(where R^1 and R^2 may be the same or different and are each selected from the group consisting of an alkyl group, an optionally substituted phenyl group, an optionally substituted naphthyl group, and an optionally substituted cycloalkyl group, or together form an optionally substituted alicyclic ring;

R^3 is one selected from the group consisting of an alkyl group, a perfluoroalkyl group, an optionally substituted naphthyl group, an optionally substituted phenyl group, and a camphor group;

R^4 is a hydrogen atom or an alkyl group;

Cp is an optionally substituted cyclopentadiene;

M is rhodium or iridium;

X is an anionic group; and

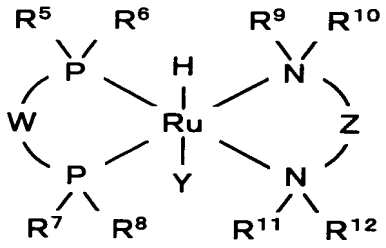
* represents an asymmetric carbon.)

3. The process for producing the optically active alcohol according to claim 1 or 2, wherein in general formulae (1) and

(2), R^1, R^2, and R^3 may be the same or different and each represent a phenyl group, a phenyl group having a C_1-C_5 alkyl group, a phenyl group having a C_1-C_5 alkoxy group, or a phenyl group having a halogen substituent.

4. A process for producing an optically active alcohol, comprising placing a metal complex represented by general formula (3) and a ketone compound in a polar solvent and stirring the mixture under pressurized hydrogen to hydrogenate the ketone compound to thereby obtain the optically active alcohol:

General Formula (3)



(where W is an optionally substituted bonding chain;

R^5 to R^8 may be the same or different and each represent an optionally substituted hydrocarbon group; R^5 and R^6 may bind each other to form an optionally substituted carbon chain ring; and R^7 and R^8 may bind each other to form an optionally substituted carbon chain ring;

R^9 to R^{12} may be the same or different and each represent a hydrogen atom or an optionally substituted hydrocarbon group;

Z is an optionally substituted hydrocarbon chain;

Y is an anionic group other than BH_4; and

each ligand of the ruthenium may be at any position.)

5. The process for producing the optically active alcohol according to claim 4, wherein, in general formula (3), W in R^5R^6P-W-PR^7R^8 is a binaphthyl group which is bonded to the phosphorus atoms at 2-position and 2'-position and which may have a substituent at any other position.

6. The process for producing the optically active alcohol according to any one of claims 1 to 5, wherein the polar solvent is methanol or ethanol.

7. The process for producing the optically active alcohol according to any one of claims 1 to 6, wherein no base is added.

8. The process for producing the optically active alcohol according to any one of claims 1 to 7, wherein the ketone compound is unstable in the presence of bases.

9. The process for producing the optically active alcohol according to any one of claims 1 to 8, wherein the ketone compound is a cyclic ketone, a ketone having an olefin moiety, a ketone having an acetylene moiety, a ketone having a hydroxyl group, a ketone having a halogen substituent, a chromanone derivative, a diketone, a ketoester, or a ketoamide.

10. The process for producing the optically active alcohol according to any one of claims 1 to 9, wherein the ketone compound is a ketone compound having a halogen substituent at α-position or α,β-alkynyl ketone.